Genito-urinary tuberculosis — experience with 52 urology inpatients

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Abstract **The current trend in South African health services is toward primary care. Pulmonary tuberculosis is well understood by the majority of primary care doctors and nurses, whereas genito-urinary tuberculosis may not be as easy to diagnose and treat.**

We reviewed our experience with this condition in 52 patients, who represented 0,74% of urology admissions between 1986 and 1991. There was a 3:2 male/female ratio, the age range was 7-76 years (mean 43 years), and the disease was more common among blacks and coloureds than among whites. Multiple sites of involvement were fairly common. Seventy-five per cent of patients had renal involvement and 17% epididymal involvement. The commonest presenting complaints were urinary frequency and haematuria, although flank and scrotal pain were also reported by a number of patients. Physical examination seldom helped to suggest the diagnosis. On microscopic examination and culture of the urine, sterile pyuria was present in only 50% of our patients and 29% had positive cultures for a 'normal' coliform organism. Fifty patients underwent excretory urography and the findings were very varied. Patients were treated primarily with antituberculosis drugs, but 58% also required some form of surgery; nephrectomy was the commonest operation. Ureteral strictures developed in over 50% of cases with renal involvement.

We conclude that the diagnosis of genito-urinary tuberculosis is not simple, and that treatment must include regular follow-up at a specialist institution.

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The genito-urinary system is the leading site of extrapulmonary tuberculosis.[1,2] In the First World, about 8-10% of patients with pulmonary tuberculosis will develop genito-urinary tuberculosis, whereas in Third-World countries the incidence is quoted as 15-20%.[3]

With the current emphasis on primary health care in South Africa at the expense of the referral hospitals, we felt it prudent to review our experience in order to evaluate whether primary care clinics are likely to be equipped to diagnose and treat genito-urinary tuberculosis. Unlike pulmonary tuberculosis, genito-urinary tuberculosis is not notifiable in South Africa; the actual incidence is thus uncertain. We were therefore forced to base this study only on patients who were admitted to the urology wards at Tygerberg Hospital, where our computer-based discharge data allowed such patients to be identified. We reviewed our data from 1986 to 1991.

Patients and methods

From 1986 to 1991, all patients with a discharge diagnosis of genito-urinary tuberculosis were reviewed. Involvement of the female genital system is excluded as such patients, who most commonly present with infertility, are seen by gynaecologists. In 10 patients there were multiple sites of active tuberculosis but, when the urinary system or male genital system was involved, alone or as part of more widespread disease, the patient was diagnosed as having genito-urinary tuberculosis and was managed by the Department of Urology.

Some patients were admitted more than once and in 4 patients there was insufficient evidence to confirm the diagnosis; this left a patient population of 52 with confirmed genito-urinary tuberculosis. In these patients all available clinical, radiological and bacteriological data were accessed and reviewed. The diagnosis was considered proven only on a positive culture of *Mycobacterium tuberculosis* or typical histological findings, including acid-fast organisms. Typical histology without identification of organisms was considered 'diagnostic' (thus allowing treatment) in only 4 patients.

Results

Epidemiology

Incidence

During the review period there was a total of 11 152 admissions to the Urology Service at Tygerberg Hospital. In 83 (0,74%) the diagnosis was genito-urinary tuberculosis. As mentioned previously some patients were admitted more than once, leaving 52 individual cases of genito-urinary tuberculosis for review.

Sex

There were 31 men and 21 women, giving a male/female ratio of 3:2.

Race

Overall 50% of admissions were coloured, 44% white and only 6% black. However 19% of the patients with genito-urinary tuberculosis were black, making the condition 3 times more common among members of this race group than expected. Likewise coloured patients made up a greater proportion of the genito-urinary tuberculosis population (69%) than the overall urology population (50%).

Age

The mean age of patients was 43 years, but ages ranged widely, from 7 years to 76 years.

Organs involved

The following organs were involved in our 52 patients (some with more than one site of involvement).

Kidney

Thirty-nine patients (75%) had renal involvement, including 7 with multiple sites, namely 4 with active pulmonary tuberculosis, 2 with joint disease, 2 with prostatic involvement and a further 2 with epididymitis.

Ureter

Although the incidence of ureteritis is not known, 20 (38,5%) patients developed ureteric strictures. This was always secondary to renal disease — thus 20 of 39 (51,3%) patients with renal tuberculosis developed ureteral strictures. Involvement of the ureter is probably commoner than this, but only becomes apparent when a stricture develops.

Bladder

Tuberculous involvement of the bladder is always considered to be secondary to renal granuloma formation with subsequent tuberculous bacilluria.[4,5] Because cystoscopy and bladder biopsies are not part of our routine work-up in cases of urinary tuberculosis, the incidence and extent of tuberculous cystitis in our patients are unknown. However of 30 patients in whom cystoscopy was performed, only 6 (20%) had macroscopically normal bladders. Cystoscopic findings included an acute cystitis, erythema and punctate bleeding, ulcers and nodules sometimes suggestive of carcinoma.

Prostate

Prostatic tuberculosis is historically described as a rare condition,[3] but 5 of our patients (9,6%) had biopsy-proven prostatic involvement. Three of these patients also had evidence of renal tuberculosis and 1 had associated tuberculous epididymitis. The remaining patient had bladder involvement but no radiological evidence of renal tuberculosis.

Epididymis

Nine patients (17,3%) had epididymal involvement, 4 (44%) of them with multiple organ involvement (renal 2, prostatic 1 and pulmonary 1).

Urine cultures only

In 3 patients urine cultures for *Mycobacterium tuberculosis* were positive without clinical or radiological signs suggesting the specific location of the disease. One had a proven renal cell carcinoma, while the other 2 had normal excretory urography.

Concurrent active pulmonary tuberculosis

Synchronous open pulmonary tuberculosis was present in 5 (9,6%) cases.

Clinical presentation

The incidence of symptoms in these patients is listed in Table I.

TABLE I.
Symptoms in genito-urinary tuberculosis

	No.	%	
Frequency	16	30,8	
Macroscopic haematuria	16	30,8	
Flank pain	11	21,2	
Flank sinus	1	1,9	
Urinary fistulas	2	3,9	(vesicocutaneous or perineal
Epididymo-orchitis	7	13,5*	
Loss of weight	5	9,6	

* This includes both acute scrotal pain and chronic swelling or draining sinus.

Signs on examination

In the majority of patients no abnormality was detected on physical examination. The commonest finding was a scrotal or epididymal mass, noted in 9 patients (17,3%). Prostatic nodules or induration (often suggestive of carcinoma) were found in 5 patients (9,6%). Other less common signs noted in individual patients included flank masses, flank sinuses and urinary fistulas. Few patients had systemic signs of tuberculosis; only 4 (7,7%) had fever, and another 4 cachexia.

Urine microscopy and routine cultures

The initial urine microscopy and routine culture revealed sterile pyuria in 26 patients (50%), haematuria in 15 (28,9%) and pyuria with positive cultures in 5 (9,6%). The incidence of 'normal' urinary tract infection was higher during the course of investigations; an additional 10 patients had positive conventional cultures yielding 15 cases (28,85%) with various coliforms cultured at some stage. Organisms cultured were: *Escherichia coli* (6), *Klebsiella* (5), *Proteus* (3), *Streptococcus faecalis* (1) and *Enterobacter* (1).

Radiology

In 50 patients excretory urography was the primary radiological examination; of the remaining 2 patients 1 had ultrasonography alone and the other ultrasonography in conjunction with retrograde pyelography.

The excretory urographic findings were abnormal in 40 patients (81%) and normal in only 10 (19%). Bilateral disease was noted in 5 patients (9,6%), right-sided renal disease in 19 (36,5%) and left-sided disease in 15 (28,9%). The laterality/location of renal tuberculosis was uncertain in 3 patients (5,8%) who had other

abnormalities on radiology not suggestive of tuberculous disease (renal cysts, etc.).

The findings secondary to genito-urinary tuberculosis on excretory urography varied from subtle minor caliceal deformities (Fig. 1) to gross cavitation (Fig. 2) and non-function with calcification (Fig. 3). The spectrum of findings was so diverse that it is not practical to classify them all, but Table II lists some of the common findings. Other findings noted in individual patients included infundibular stenosis, missing calyces (Fig. 4), irregular or clubbed calyces, papillary necrosis, beaded ureters, ureteritis cystica and small-capacity bladders.

TABLE II.
Common findings on excretory urography

Cavitation	19 (3 early/subtle)
Ureteric stricture	13 (25%) (9 at ureterovesical junction)
Mass effect	3
Poor function	3
Total non-function	6
Segmental non-function	1
Calcification	5 (2 with non-function also)

FIG. 1.
Intravenous pyelogram showing apparent diverticulum of lower pole calyx on the left. Patient had confirmed genito-urinary tuberculosis, so this must be considered early cavitation.

Diagnosis

Culture of urine for *M. tuberculosis* was the most reliable method of confirming the diagnosis. Of 47 patients in whom this was performed and the result available for review, the culture was positive in 36 (76,6%) and negative in only 11 (23,4%) On average 3 cultures per patient were done and this is recommended as an initial evaluation. Even in cases where the clinical involvement was of the epididymis, 5 of 9 patients had positive urine cultures.

A histological examination was performed in 35 patients (67%) but proved the diagnosis (typical histology and organisms seen) in only 8 (22,9%) and was totally nonspecific in a further 8 patients. In the majority of patients (54,3%) the histological findings suggested tuberculosis, but no organisms were identified.

Treatment

Almost all patients underwent medical therapy with isoniazid, rifampicin and pyrazinamide, usually for 6 months. Only occasionally was alternative antituberculosis therapy used. We encountered no resistant organisms but a lack of patient compliance leading to 'recurrence' was common, often requiring longer courses of treatment.

FIG. 2.
Intravenous pyelogram showing marked cavitation and clubbed calyces of the right kidney.

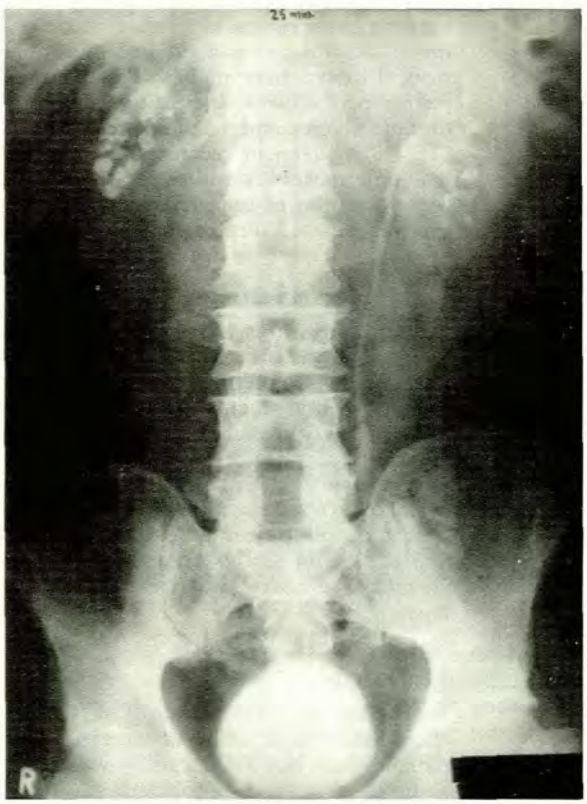

FIG. 3.
Intravenous pyelogram showing calcification of right kidney, associated with non-function.

FIG. 4.
Intravenous pyelogram reported as normal, but note the missing lower-pole calyx on the left when compared with that on the right.

Thirty of our patients (58%) required some form of surgery, either radical extirpative, reconstructive or diagnostic only. Some patients had more than one operation. Twenty-three patients (44%) underwent extirpative procedures, including 17 nephrectomies, 4 orchidectomies and 1 epididymectomy. Eight patients (15,4%) underwent reconstructive procedures, namely 4 augmentation cystoplasties, 2 ileocalicostomies, 1 reimplantation of the ureter and 1 pyeloplasty. Three patients required surgery purely for diagnostic purposes.

Ureteric strictures

Ureteric strictures are the commonest recognisable 'complications' of genito-urinary tuberculosis. Such ureteric involvement is always secondary to a renal lesion. Twenty patients had or developed ureteric strictures (38,5%) giving an incidence of 20 in 39 (51,3%) among patients with renal disease. Thirteen of these patients had evidence of the stricture on the initial evaluation (65%), but the remainder developed ureteric strictures while on medical treatment. Five patients (25%) developed this complication during their first year on antituberculosis treatment, and 2 at an even later stage.

Outcome

Eight patients (15,5%) were lost to follow-up so that their outcome must be considered unknown. Three patients died, but in 2 mortality was clearly not a direct result of genito-urinary tuberculosis (1 died of renal cell carcinoma and 1 of AIDS).

Four patients, though alive, had an outcome that was considered poor; all 4 are in varying degrees of renal failure, and 2 require additional cutaneous urinary diversion.

Three patients were cured of their genito-urinary tuberculosis and maintained stable renal function, but could not be considered to have had a good outcome for various reasons. One patient who lost a kidney because of an autonephrectomy developed hypertension, controlled on medical treatment. Another patient who had a neurogenic bladder before she developed genito-urinary tuberculosis was in chronic renal failure initially. Lastly an elderly woman with severe chronic obstructive airways disease was unfit for surgery and required embolisation of a hydronephrotic kidney which was causing considerable pain.

Thirty-four patients (65%) had what was considered a good outcome in that the urine became sterile, total renal function was normal and the patient became asymptomatic in terms of symptoms relating to genito-urinary tuberculosis. However 9 of these patients underwent nephrectomy as part of the treatment, and a further patient lost a kidney as the result of an autonephrectomy.

Discussion

In our experience genito-urinary tuberculosis is an aggressive and destructive condition which requires early diagnosis and effective treatment. The clinical presentation is often confusing, with few protean signs or symptoms. The commonest reason for presentation among our patients was haematuria, and macroscopic haematuria was as common as urinary frequency. This finding was rather different from those of other reports; Gow[3] reported macroscopic haematuria in only 10% of patients, and Narayana[5] found haematuria a presenting symptom (not specified as macroscopic or otherwise) in 26%. Both authors reported frequency to be a far more common reason for presentation. Haematuria more often suggests renal or bladder carcinoma or urolithiasis to the urologist, but is often considered by general practitioners to be suggestive of urinary tract infection, for which a course of antibiotics is prescribed. In this context, it is significant that 15 patients (28,85%) had coliform organisms cultured from their urine at some stage. To the inexperienced, this would tend to support the diagnosis of a simple urinary tract infection; and a more careful search for more subtle signs is obviously required. The classic finding of sterile pyuria was present in only 50% of cases.

Physical examination of the patient was most often non-contributory but signs of epididymal involvement were the most common finding. However even in cases where this was present the diagnosis was not always simple. Three patients presented initially with clinically acute epididymitis (treated with tetracyclines) which failed to resolve, and subsequently developed a scrotal abscess or sinus. A further 3 patients presented with a chronic painful scrotal mass and draining sinus which were more suggestive of tuberculosis. One patient presented with a painless scrotal mass mimicking a testis tumour. In the other 3 patients the epididymis was noted to be enlarged and nodular, but it was not the primary complaint. A relatively short history therefore, suggesting acute epididymitis, was also a feature of a series of 20 cases reported by Ferrie and Rundle.[6]

In a similar clinical study from the USA, Simon *et al.*[2] reported on 78 patients whom they had treated over a 12-year period, including some with female genital involvement. More comprehensive methods were used in accessing patients. As expected genito-urinary tuberculosis is commoner in South Africa, and as already mentioned is certainly more prevalent in our black and coloured communities. Simon *et al.*[2] describe a similar

set of presenting symptoms and like us found constitutional symptoms usually associated with tuberculosis to be uncommon. They also found that 20% of their patients had no local or constitutional symptoms that suggested the diagnosis, which was made on the basis of investigations performed because of an abnormal urine sediment.

Although the incidence of concurrent open pulmonary tuberculosis reported in other series is much higher, involving up to almost 50% of patients,[7] only 5 of our patients (9,6%) had concurrent active pulmonary tuberculosis.

Our nephrectomy rate was 32,7% for all cases and 41% for patients with specifically demonstrable renal involvement. In Narayana's[5] study 62% of patients underwent a nephrectomy; this compares favourably with our figures, although the indications for nephrectomy in that study were broader, including not only non-functioning but also 'severely destroyed' kidneys. We believe that with early diagnosis and effective conservative treatment we should attempt to avoid this destructive procedure. Short-course chemotherapy, successfully employed and recommended by Gow and Barbosa,[8] requires simplification in our experience to attain any degree of compliance. Therefore triple therapy for a full 6 months was used in most patients.

A high index of suspicion is therefore needed. Awareness of the indications for radiological examination, and accurate interpretation of the findings, are essential. As discussed, the radiological signs are varied and sometimes subtle. It is doubtful if primary health care clinics can be expected to make the correct diagnosis reliably. However in patients with any degree of haematuria, repeated urinary tract infections or cystitis-like symptoms with sterile pyuria, especially black and coloured patients, the condition should be suspected and appropriate cultures performed. Subsequent referral to a tertiary-level hospital is appropriate when the diagnosis of genito-urinary tuberculosis is confirmed, as will be the case when cultures are negative in order to exclude such conditions as transitional cell carcinoma. The high incidence of ureteric strictures that often develop once on medical treatment makes the use of frequent imaging techniques (preferably intravenous urography) during follow-up essential. The facts that this disease may progress silently and that absence of symptoms does not exclude progression have previously been demonstrated.[4] We therefore feel that primary health care clinics are not equipped to manage these patients, who require regular follow-up at a tertiary hospital, but that they should suspect the condition when faced with the commonest symptoms and send appropriate cultures. It is hoped that earlier diagnosis and treatment, including attention to patient compliance, will reduce the need for destructive (and expensive) surgery.

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